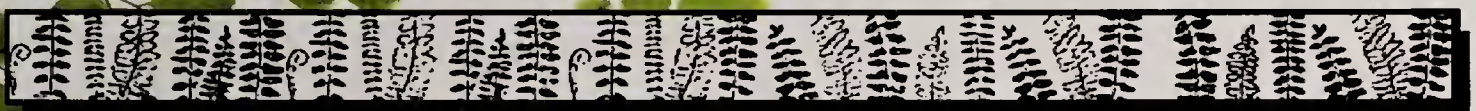




Hardy Fern Foundation Quarterly



Winter 2011

THE HARDY FERN FOUNDATION

P.O. Box 3797

Federal Way, WA 98063-3797

Web site: www.hardyferns.org

The Hardy Fern Foundation was founded in 1989 to establish a comprehensive collection of the world's hardy ferns for display, testing, evaluation, public education and introduction to the gardening and horticultural community. Many rare and unusual species, hybrids and varieties are being propagated from spores and tested in selected environments for their different degrees of hardiness and ornamental garden value.

The primary fern display and test garden is located at, and in conjunction with, The Rhododendron Species Botanical Garden at the Weyerhaeuser Corporate Headquarters, in Federal Way, Washington.

Satellite fern gardens are at the Birmingham Botanical Gardens, Birmingham, Alabama, California State University at Sacramento, California, Coastal Maine Botanical Garden, Boothbay, Maine, Dallas Arboretum, Dallas, Texas, Denver Botanic Gardens, Denver, Colorado, Georgeson Botanical Garden, University of Alaska, Fairbanks, Alaska, Harry P. Leu Garden, Orlando, Florida, Inniswood Metro Gardens, Columbus, Ohio, New York Botanical Garden, Bronx, New York, and Strybing Arboretum, San Francisco, California.

The fern display gardens are at Bainbridge Island Library, Bainbridge Island, WA, Bellevue Botanical Garden, Bellevue, WA, Lakewold, Tacoma, Washington, Lotusland, Santa Barbara, California, Les Jardins de Metis, Quebec, Canada, Rotary Gardens, Janesville, WI, and Whitehall Historic Home and Garden, Louisville, KY.

Hardy Fern Foundation members participate in a spore exchange, receive a quarterly newsletter and have first access to ferns as they are ready for distribution.

Cover design by Willanna Bradner

HARDY FERN FOUNDATION QUARTERLY

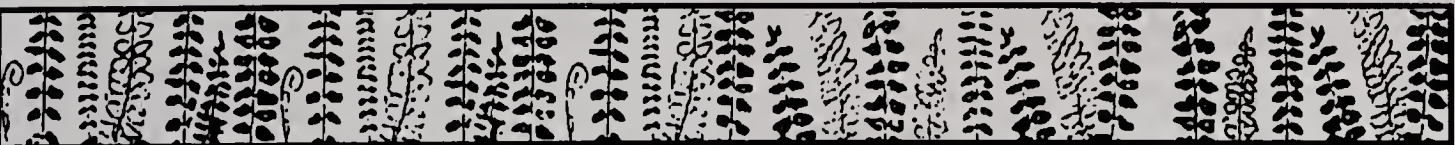
THE HARDY FERN FOUNDATION QUARTERLY

Volume 21 No. 1 Editor- Sue Olsen

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President's Message	2
Patrick Kennar	
American Fern Society - 2010 Fern Foray	3
Tom Stuart	
<i>Thelypteris noveboracensis</i>	
Tapering fern, New York fern	4-5
James R. Horrocks	
December on the Olympic Peninsula	5-8
Richie Steffen	
Ferns of Hawai'i	9-11, 14
Joan Eiger Gottlieb	
Color Photos	12-13
Introducing a New Demonstration Woodland Fern Garden at Creasey Mahan Nature Preserve	15-16
Book Review: <i>Fern Ecology</i>	
Tom Stuart.....	17-19
That Was the Winter That Was (TW3) and More	
Jerry Hudgens.....	20-22
BPS/HFF Southeast USA Fern Tour	22
2011 Spore Exchange	23-24



President's Message

Happy New Year to all,

The temperature dropped and snow came down before Thanksgiving; the ball dropped in New York on New Years and so did the rain in many areas. Mister Woodwardia took a hit and Miss Hispidulum is history.

The Arctic blast around Thanksgiving gave new meaning to the term "Hardy"! I've said good-byes to a few of my edgy ferns and am renewing my faith in mulch. It will be interesting to see data from affiliate gardens for analogous results.

The difference between Puget Sound area floods and those in Queensland, Australia is that we don't have snakes and crocodiles in the streets. Is it just me or is the weather becoming more predictably unpredictable?

I hope everyone enjoyed, tolerated or celebrated the holidays with proper enthusiasm.

The first Fall Social was hosted by the Hardy Fern Foundation on Saturday November 13, 2010 at the Center for Urban Horticulture, Seattle, Washington. Ferns for sale were supplied by Foliage Gardens, Sundquist Nursery and the Hardy Fern Foundation. Richie Steffen brought in a remarkable collection of pyrrhosia, drawing a great deal of attention. Sue Olsen gave an enlightening talk on her recent trip to Scotland and Ireland. In spite of rather rainy conditions and rugged trails, she managed to take many beautiful slides in "Search of the Killarney Fern". This was a most enjoyable event garnished by a delectable array of food thanks to Michelle Bundy.

We will again be participating in The Northwest Flower and Garden Show, February 23-27, 2011 with our educational display. We plan on featuring Richie's fabulous collection of felty ferns as well as a large "cut arrangement" of sorts, highlighting winter worthy ferns and other showy, seasonal items. Volunteers are always welcome to help staff the booth, free admission to the show is included. Contact Michelle Bundy, (hff@rhodygarden.org) to sign up.

The Southeast US Fern Foray will take place from June 13-27, 2011. Participants will be touring public and private gardens as well as nurseries and field sites. This trip is being organized by Naud Burnett and Kent Kratz. There are still a few (very few) spots available. See the Fall 2010 Quarterly for a full itinerary.

On behalf of the Hardy Fern Foundation, I would like to thank Sue Olsen for once again hosting a gala Christmas holiday party, and many thanks to those who brought so many delicious food creations.

This New Year brings forth enthusiasm for our many projects and the much awaited completion of our operating agreement between the Rhododendron Species Foundation and the Hardy Fern Foundation.

Best regards to all,
Pat Kennar

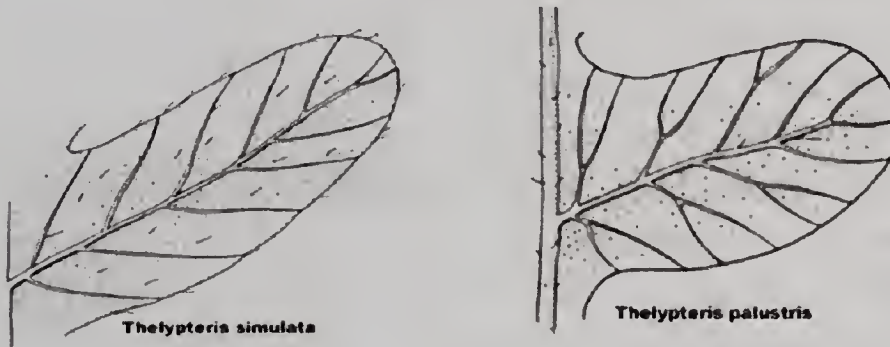
American Fern Society 2010 Fern Foray

Blue Hills Reservation, Quincy, Massachusetts

Tom Stuart ~ Croton Falls, NY

This August foray was led by the very capable team of Ray Abair and Don Lubin. One highlight was near Ponkapoag Pond - the Ponkapoag were a tribe in Massachusetts. This is the type location for *Thelypteris simulata*, the Massachusetts fern. It is intermixed with the marsh fern, *T. palustris*, as it often is, and went undetected until the last decade of the 19th century because it is so similar to the marsh fern. For some unfathomable reason the specific name is said to refer to its similarity to the lady fern; my, my, what we are asked to swallow. In any case there are three characters used to differentiate the two *thelypteris*.

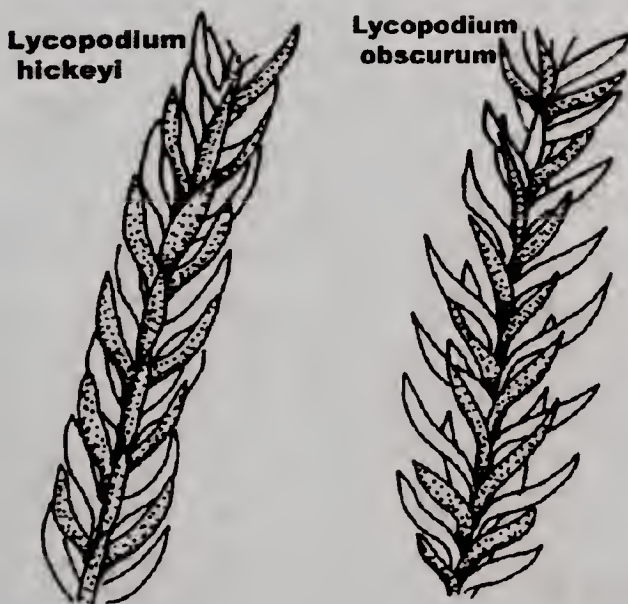
- the margins of the fertile pinnules are inrolled in *T. palustris*, not so with *T. simulata*
- lowest pinnae occupy the same plane as other pinnae in *T. palustris*, but are reflexed forward in *T. simulata*
- veinlets between mid-vein and margin of sterile pinnules are forked in *T. palustris*, not so in *T. simulata*, as shown here:



Drawings: Anne Lacy in the
Field Guide to Northeastern Ferns,
New York State Museum, 1981.

Speaking of similarities, we also saw *Lycopodium obscurum* and *L. hickeyi*. Having James Hickey, discoverer, along to point out the difference was much appreciated.

Both have six ranks of needle-like leaves equally spaced around the lateral branches. *L. obscurum* has the lower rank shorter than all the others; *L. hickeyi* has them all the same length.



Drawings: Robbin Moran in *The Ferns
and Allied Plants of New England*
Tyron and Moran, 1997



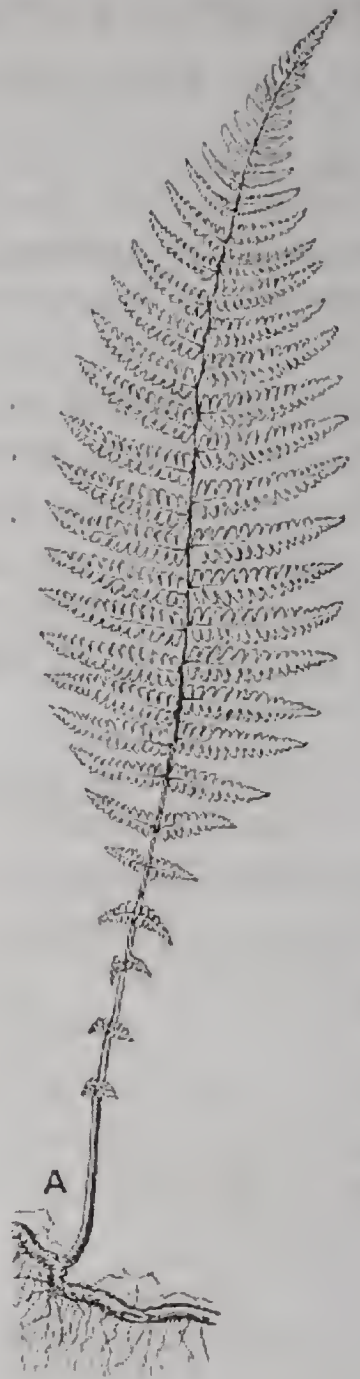
Jim Hickey and disciple Eddie Watkins, Colgate
Photo courtesy of Tom Stuart

Thelypteris noveboracensis

Tapering fern, New York fern

James R. Horrocks
Salt Lake City, UT

The genus *Thelypteris* comprises nearly a thousand species, making it one of the largest genera of ferns. Species in this genus have been assigned in the past to *Dryopteris*, *Phegopteris*, *Cyclosorus*, *Parathelypteris*, etc. The species *noveboracensis* is a well known eastern fern very similar to the west coast *T. nevadensis*, but the latter has a more compact rhizome, therefore being much less invasive. The tapering habit at both ends of the frond distinguishes *T. noveboracensis* from *T. palustris*, the marsh fern, and *T. simulata*, the Massachusetts fern or bog fern, whose fronds are widest at the base. *T. noveboracensis* is native from Newfoundland down the eastern coast to Georgia and across to Arkansas and Oklahoma, north to Ontario, Canada. It is abundant in moist woods, thickets, and at the margins of swamps in sub acid soils. Durand describes it as also found in relatively dry shaded woods, its yellowish-green fronds giving the effect of rippling waves of sunshine in large colonies, even in the deepest shade. From a distance this species may be mistaken for the hayscented fern, *Dennstaedtia punctilobula*, but close inspection shows striking differences in that the pinnae of the latter are widest at the base and, although considered bipinnate, the pinnules of the hayscented fern are again partially cut into obtuse, toothed divisions. *T. noveboracensis* is very hardy from Zone 4 and is a very common colonizer, even up to the roadside in wetter area.



Description: The rhizome is cord-like, long-creeping, just below the soil surface, and quite invasive. The fronds appear in tufts, that is, as Lellinger states: “with the fronds distant for several centimeters, then closely spaced with old, adherent stipe bases.” Sterile fronds are comparatively short-stiped whereas the fertile fronds have longer stipes that can be one-half to two-thirds the length of the blade. The stipes are straw-colored above but dark-brown or reddish-brown below with a few scales. The fertile fronds are somewhat taller and narrower and appear later. The one to two foot deciduous fronds are a cheery yellow-green and are technically pinnate-pinnatifid as the pinnules do not divide all the way to the midrib of the pinnae. The fronds are widest near the middle. The pinnae taper gradually toward both ends but the nearer they are to the base the further apart they become and the basal pinnae are reduced to mere wings or, as Lellinger calls them, auricles. The round sori are similar to those of the genus *Dryopteris* but smaller, yet distinct in a double row nearer the margins than to the pinnule midvein. The indusia are kidney-shaped early on but become reduced in size at maturity.

Culture: This fern is quite easily grown but can be too aggressive for the small garden. Where there is ample room, it is very attractive. It is at its best in humus-rich sub acid soil and, if given enough moisture, it can take some sun. As the rhizomes creep along and intertwine, they can produce a very dense growth which is quite striking. It is well worth attempting if you have the space.

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December on the Olympic Peninsula

Richie Steffen
Federal Way, WA

In an effort to explore and learn more about native ferns of the Northwest, Michelle Bundy, curator of the Hardy Fern Foundation and Richie Steffen, curator of the Elisabeth C. Miller Botanical Garden, spent a weekend in early December looking for variations and hybrids of the ferns on the Olympic Peninsula coastline of Washington State. In particular we were interested in finding non typical forms of *Polypodium scolieri*, *Polypodium glycyrrhiza*, *Polystichum munitum* and *Blechnum spicant*. We were also interested in exploring for natural hybrids between the two *Polypodium* species.

Day 1 Lake Quinault

The Olympic Peninsula is known for abysmal weather especially during the winter. Wave after wave of stormy weather can be blown in from the Pacific Ocean, often lasting for weeks and battering the coast with high winds and steady rain. Almost unbelievably, the entire weekend of our trip remained beautifully clear and sunny, a rare, but joyous event! Our first stop of the day was the famous Lake Quinault Lodge. This rustic lodge built in 1926 is a beautiful remnant of an earlier and wilder time in Washington. Nestled along the shore of Lake Quinault at the base of the Olympic Mountains and surrounded by forests, it is the starting point of a number of popular hiking trails. We spent the afternoon wondering trails looking at hundreds, if not

thousands, of *Blechnum spicant*. Commonly known as deer fern it is particularly prolific in this area. The foliage and habit of this fern is remarkably consistent in the Northwest with very little variation. However the plants in this area occasionally have a frond or two that fork at the tip. This slight difference rarely occurs in other population around the Puget Sound region, but happens with much more frequency in this small location. Unfortunately, this trait in this population seems to rarely reoccur or improve with cultivation. We were hoping to find forms with a uniform forking on all fronds, but alas, it was not to happen on this trip.

Traveling on, the final destination of the day was the small town of Forks with a population of a little over 3,000. Forks was built on the foundations of the timber industry, suffering under a steady decline of jobs only to find its salvation in vampires and werewolves. Author, Stephenie Meyer chose the town as the setting for her remarkably successful book series *Twilight*. *Twilight* pits vampires against werewolves over the heart of a young girl. With over 100 inches of rain a year you can clearly see that doom and gloom loving monsters could comfortably reside here.

Day 2 Searching Along the Ocean

The next morning we headed for the coast. A heavy frost covered the roadside weeds and brush with a silvery white glow making the short drive particularly beautiful. Our first stop was Ruby Beach, one of the most striking beaches along the Washington coast. High wooded bluffs perch above the ocean with trails weaving their way down hill to gravel and sand beaches. Large drift logs and tree trunks weathered gray from sea water and turbulent tides form a maze from the bottom of the bluffs to the high tide mark leaving a thin strip of beach between the log piles and the crashing waves. Looking out over the Pacific Ocean tall pillars of rock stand in the sea like sentinels. Spires of salty spray burst from the base as the waves crash against them. As we leave the car we follow the trails through wind blown Sitka spruce, red alder, and bigleaf maple. The deciduous trees hold lush colonies of *Polypodium glycyrrhiza*, licorice fern, firmly rooted into the moss laden branches and trunks. The evergreen trees held thick patches of *Polypodium scolopendri*, Scouler's polypody or leatherleaf polypody. This provided an excellent opportunity to search for hybrids. Although hybrids have been found they are extremely rare. Searching along the trail proved to be fruitless, so we decided to blaze into the brush. Within a few feet we quickly learned exactly how thick a thicket can be. Forcing our way down a ravine most ferns were quite typical in form and many were far above our heads beyond our reach. We decided to return to the car and drive on.

The next stop was Second Beach. The parking was along the main highway with several robust patches of licorice fern along the parking area. Behind this lay a dense forest of Sitka spruce and Western red cedar. In the woodland progress is generally slow. One of the most prominent groundcovers is salal our native shrubby evergreen *Gaultheria shallon*. Although, a handsome plant, the thin twiggy branches form impenetrable tangles from a few feet tall to thickets over your head. Scattered throughout are fallen trees, most being of substantial girth adding to the obstacle course. It is not uncommon to come across trees three feet or more thick in these ancient seaside forests. Once you are off the road and in the midst of the trees you realize it is a narrow strip of forest between the highway and the cliffs with substantial drops to gravel and log covered beaches.

Towering trunks held huge old colonies of *Polypodium scolieri*. Many of the thick old Sitka spruce trunks were bizarrely distorted with huge burls creating a scene from another planet. Eerie mist from the ocean below caught the sun's rays glowing through the high tree canopy. (photo below)

Polypodium scolieri was prevalent in the woodland. It was amazing to see how adaptable this excellent fern is from the darkest shade to filtered sun. In the darkest areas the deep green leathery fronds were over a foot long, bigger than anything we have ever seen in a garden setting. On the edge of the bluff the bright light and constantly blowing sea breeze kept the ferns tight and dense with fronds only growing under six inches long. After a thorough search we could find no signs of hybridization with the licorice fern. The species seems to be genetically very consistent with variations in size mostly caused by environmental pressures.

Racing against the fading light of the short December days we decided to spend the last few hours inside the Olympic National Park's Hoh Rainforest. This spectacular rare coniferous rainforest is a site to behold. The drive there took us through ancient old growth forests. These impressive giants line the roadside and seem impossibly large. Parking at the visitor center we followed trails to the Hall of Moss. Walking through the virgin Douglas fir, Western red cedar and Western hemlock forest makes you feel very small. Ferns are one of the most successful companions of these old trees. The forest floor was filled with *Polystichum munitum*, sword fern, and *Blechnum spicant*. Near the visitor center a clear stream wandered through a low marshy area. From a trail above the water we had the pleasure of seeing spawning salmon swimming up stream, apparently a common site this time of year in the park. A short hike through the conifers brought us to the Hall of Moss. It is a grove of old bigleaf maples draped from branch tip to trunk in *Selaginella oregana* and various mosses. The grand old trees were free of leaves giving us full view of their skeletal beauty. The *Selaginella* and moss grew so thick it made you wonder how the trees could bear so much extra weight. Scattered along the green carpeted branches were beautiful cascading swaths of licorice ferns. Under the maples the understory was thick with *Polystichum munitum*, sword fern. After taking plenty of photos we returned to the car in the failing light. It was a lovely way to end the day.

Day 3 The Elwah River

On our final day we started to drive home going along the north side of the peninsula. A few brief stops in the



Sitka spruce burls ~ Photo courtesy of Michelle Bundy

morning yielded little. So far, the trip had been beautiful, but disappointing. The ferns we had found were for the most part typical with almost no variation in foliage. After an hour on the road we decided to take the next turn to drive along the Elwah River. The road leads up to an aging dam that is slated for removal to revive the salmon runs in the region. Neither, Michelle nor I have been along the Elwah and this seemed like an excellent opportunity to take one last look for variants. Fortunately, this was the best diversion of the trip. Along the road we passed a steep rock wall covered with licorice fern. This small area provided the treasures of the journey. We found two very distinct selections that are very different from the typical form. The first fern's fronds varied from one half to one third the length of a normal frond with each pinnule uniquely undulated and twisted. The entire plant showed this trait in a uniform way. The second unusual form, not more than ten feet away from the first find, showed a marked short congested humped shaped frond with a strikingly unique bluish midrib. Each frond is only one third to one quarter the length of the typical form.

A few divisions were collected of both forms to be propagated by Michelle for future distribution through the Hardy Fern Foundation. The undulated and twisted selection was collected under the collection number of MBRS006 with the provisional cultivar name 'Green Garland'. (photo pg. 15) The second selection with short more congested fronds and the unusual bluish midrib is noted under the collection number MBRS007 with a provisional cultivar name of 'Christmas Elf'. (photo pg. 14)

The next step is to grow both of these selections at the Hardy Fern Foundation's main display garden to insure that these unique traits remain in cultivation. Once we are sure the selections are stable selections, the clones can be propagated and shared with our membership. I know that Michelle and I cannot wait to see how these two exciting finds will grow in the garden.



Polypodium scolieri, Photo courtesy of Richie Steffen

FERNS OF HAWAI‘I

Joan Eiger Gottlieb
Pittsburgh, Pennsylvania

“Ferns of Hawai‘i” (September 13-23, 2010) was the fourth extended workshop sponsored by The University of California (Berkeley)/Jepson Herbarium, each taught by neotropical fern specialist, Dr. Alan R. Smith. It was an irresistible opportunity to savor the ferns of “paradise.”

Part I: KAUA‘I ISLAND

Ten days in Hawai‘i were divided equally between the islands of Kaua‘i (most northwestern and oldest of the major Hawai‘ian land masses at six million years) and the Big Island of Hawai‘i (farthest east in the chain and barely one million years old). From Honolulu (on the central island of O‘ahu – home of Pearl Harbor) it was a short commuter flight to **KAUA‘I**, followed by a two-hour drive up to base camp at Koke‘e State Park. A brief stop at the Waimea Canyon Overlook revealed rainbow-hued rock layers lining an impressive north-south gorge that cuts through the western part of the island near Koke‘e and the great Alaka‘i Swamp. This wet area sits on the lava floor of a 30 square mile caldera in the convulsive volcano that created Kaua‘i. The CCC Camp at Koke‘e provided adequate, communal-style accommodations although a few extra bathrooms would have been welcome! No alarm clock is needed at Koke‘e thanks to feral chickens that roam freely all over the island. Food was prepared expertly by our workshop coordinator, Heather Driscoll, from the Jepson Herbarium, and our workshop volunteer, Amanda Vernon, a graduate student at the University of Hawai‘i. Workshop participants also helped. A mature planting of *Sadleria cyatheoides* – the signature Hawai‘ian fern – greeted us at the camp entrance. Our first assignment was keying it to species using Daniel D. Palmer’s 2003 book *Hawai‘i’s Ferns and Fern Allies*. There are six species of this striking, endemic genus on the islands.

From Koke‘e Camp the group sampled six nearby trails yielding ca. 75 fern taxa (out of a total of ca. 220 for all the major islands). About 25 more would be seen on the Big Island. The Alaka‘i and Pihea Trails approached the caldera’s bog area from opposite ends and were tackled on separate days. Thirty-seven ferns were found along the boardwalk of the Alaka‘i Trail, including five species of the endemic, epiphytic, grammitoid genus *Adenophorus*, as well as *Grammitis tenella* and *Lellingeria saffordii*, the latter two easily recognized by their small, simple, stiff fronds. *Lellingeria*

Kaua‘i



is a distinctive charmer with toothy scalloping of its sterile leaf base and entire edging of its fertile tip. Two endemic, common tree ferns - *Cibotium glaucum* (photo pg. 14) and *C. menziesii* - were seen, the former with namesake blue-gray frond undersides and the latter bearing copious, stiff, reddish-brown stipe hairs. Two additional species of *Sadleria* - *S. pallida* and *S. wagneriana* - were added to our repertoire of this beautiful genus. Unfurling fronds of *Sadleria* are bronze-colored, typical of the family Blechnaceae. (photo pg. 15) Alaka'i was also the first place where two species of whisk ferns (Psilotaceae) could be compared - *Psilotum nudum* and its flat-stemmed, more pendulous cousin *P. complanatum*. (photo pg. 14)

En route to the Pihea Trail the Kalalau Lookout (4000') offered panoramic views of the Napali coast and the sweeping, waterfall-laden cliffs that plunge into it. The trail was very steep in places, severely eroded, muddy, and slippery - a definite challenge to older legs. Two endemic species of the lycopod genus *Huperzia* - *H. phyllantha*, (photo pg. 14) and *H. serrata* - perched on tree branches and *Lycopodiella cernua*, found throughout the tropics and sub-tropics, was here as well. Yet another pair of *Sadleria* species - *S. souleyetiana* and *S. squarrosa* - was spotted and hand lenses quickly focused on their distinguishing vein and scale characters. A prize find of the day was *Schizaea robusta*, the endemic Hawai'ian relative of northeastern North America's rare curly-grass fern, *S. pusilla*. Sterile fronds of *Schizaea* are easily overlooked, resembling those of a sedge, but the stipes of its fertile leaves rise high above them and end in modified blades resembling miniature toothbrushes chock full of sporangia.

A dwarf shrub form of the endemic Hawai'ian 'ohi'a lehua tree *Metrosideros polymorpha* (Myrtaceae) predominates in the bog along the Alaka'i Trail. Numerous red stamens give its flowers the look of pom-poms. Other seed plants here include needle-leaved *Dubautia* shrubs - closely related to the silversword genus *Argyroxiphium* (Asteraceae), a citrus-scented, orange-fruited *Melicope* sp. (Rutaceae), and *Clermontia fauriei* (Campanulaceae). A sister species of the latter, *C. peleana* var. *singuliflora*, considered extinct for nearly 100 years, was rediscovered recently at one site on the island of Hawai'i. *Cheirodendron trigynum* (Araliaceae), endemic to Hawai'i, is an understory tree that can start life as an epiphytic seedling on a tree fern trunk. Indisputably, the best flowering plant find was another member of the Campanulaceae - *Trematolobelia kauaiensis*, a slender tree with wand-like racemes of rose-colored blossoms at the base of its crown. We admired this "once in a lifetime" find long enough to see an olive-colored Kaua'i amakihi honeycreeper fly in for a nectar snack.

Michelle Clark of the Fish and Wildlife Service joined us at Pihea. She pointed out that Hawai'i's remoteness has led to the **highest rate of endemism in the world - 75% of its flora and fauna are found nowhere else**. The rate for New Zealand and Madagascar is 50%. Original, pioneering species in Hawai'i came from E. Asia, the Polynesian Marquesas, and the New World tropics. Those that survived gradually morphed into well-adapted, unique species, subspecies, and varieties. More than 130 plants and most endemic Kaua'ian birds are now endangered, with large-scale fencing projects the only way to keep pigs, goats, and other destructive mammalian introductions out of fragile habitats. The only terrestrial mammal native to the islands is the hoary bat. Constant vigilance is needed to remove the worst of the plant invasives like Tahiti ginger, Australian tree fern (*Sphaeropteris cooperi*), and strawberry guava. We pulled

out young, start-up plants of these as we walked, but it is clear that the Hawai‘ian landscape is being irreversibly altered. At a trail lookout we could see the flat summit of Mt. Wai‘ale‘ale (rippling water), the 5,148’ remains of an ancient volcano that formed Kaua‘i. It is reputedly the wettest spot on earth, averaging 450” of rain per year, and is critical to the watershed.

Other trails explored on Kaua‘i included the **Ditch Trail** where we saw the first delicate plants of endemic *Asplenium macraei* (photo pg. 15), the exquisite, endemic filmy fern, *Vandenboschia draytoniana*, and the goldback fern, *Pityrogramma austroamericana*. The latter was introduced through the horticulture trade and is now naturalized on the islands. In some disturbed habitats on O‘ahu it reportedly hybridizes with the related, and similarly naturalized silver fern, *P. calomelanos*, making “fool’s gold fern,” a Hawai‘ian endemic. The **Nu alolo Trail** behind the CCC camp meandered through a rich, mesic forest (somewhat dry in Hawai‘i’s current, prolonged drought) where beautiful endemics like *Pteris irregularis*, *Doodia kunthiana*, *Marattia douglasii*, *Coniogramme pilosa*, and *Elaphoglossum wawrae* were at home. A fenced area gives conservationists protected space for re-introductions of rare trees, shrubs, and ferns. *Doryopteris angelica* and *Microlepia strigosa*, planted here, were in curled up, resurrection mode.

The **Kaluapuhi Trail**, one of the few fairly level walks in the area, and a nearby gully adjacent to the road, yielded *Ctenitis latifrons*, *Asplenium schizophyllum*, *Dryopteris mauiensis*, *Vandenboschia tubiflora*, and mature, fertile specimens of *Cibotium nealiae*, endemics all. The ‘apapane, a crimson-red, black-winged honeycreeper was a striking bird find.

The last day on Kaua‘i was divided between the Limahuli Botanical Garden near Princeville, and the Kilauea Lighthouse. As the crow flies, these are a short distance northeast of Koke‘e, but the deep canyons that slice through the area preclude a road connection, so it was a two and a half hour drive to the Garden on the one paved road that circles most of the island (true of most Hawai‘ian islands) along its southern and eastern shorelines. Intern **Nicole Shores** was our guide at the Botanical Garden. Many of the species seen (including natives) were planted here, but it was a singular chance to view *Asplenium nidus*, *Microsorium spectrum*, *M. punctatum*, *Cyclosorus interruptus*, and *Doryopteris angelica*, all of them green and growing on a wet hillside. *Azolla filiculoides* was abundant in taro ponds, fulfilling its nitrogen-fixing mission. The woody plants at Limahuli were spectacular, including orange-flowered, Kaua‘ian endemic *Hibiscus kokio* (Malvaceae), Polynesian candle-nut *Aleurites moluccana* (Euphorbiaceae), and native *Acacia koa* (Fabaceae). Saplings of koa have bi-pinnate leaves (think *Albizia*) when young and undergo an amazing transformation to cardboard-textured, simple, sickle-shaped phyllodes (leaf petiole expansions), completely replacing true leaves on adult trees. Koa (like many leguminous species) can fix nitrogen and grow on young volcanic soils all over the islands. *Acacia koa* and *Metrosideros polymorpha* are the dominant flowering trees in native Hawai‘ian rain forests.

At the Kilauea Lighthouse (northernmost spot in Hawai‘i) we were greeted



Polypodium glycyrrhiza
‘Christmas Elf’

(provisional name) coll. # MBR007

Photo courtesy of
 Michelle Bundy

Huperzia phyllantha

Photo courtesy of Tom Ballinger



Psilotum complanatum

Photo courtesy of
 Tom Ballinger

Cibotium glaucum

Photo courtesy of
 Tom Ballinger



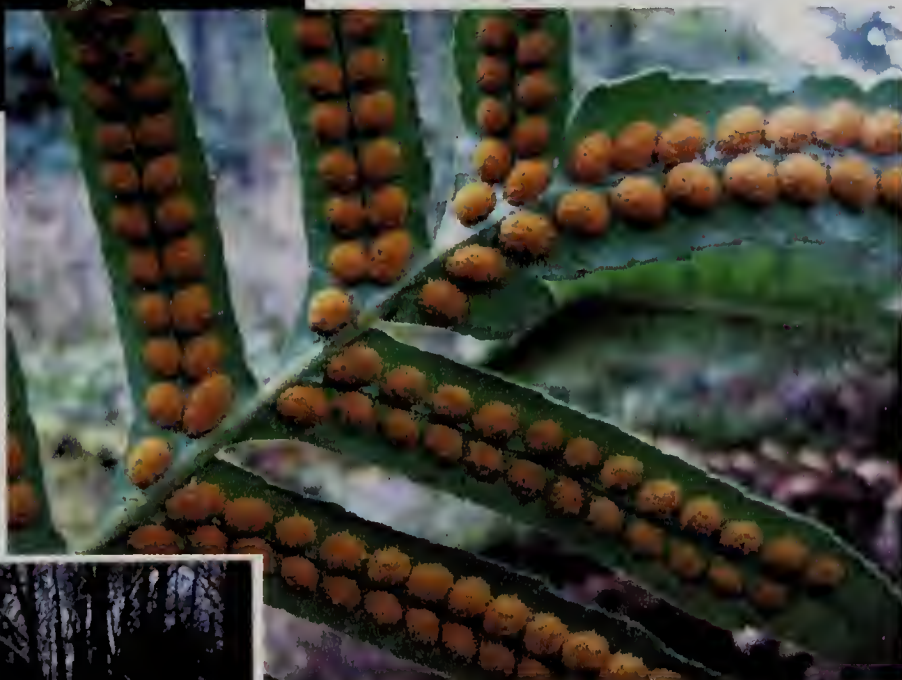


*Polypodium
glycyrrhiza*
'Green Garland'
(provisional name)
coll. # MBRS006

Photo courtesy of
Richie Steffen

Polypodium scolieri

Photo courtesy of
Michelle Bundy



Big Snow

Photo courtesy of
Joan Hudgens

Sadleria cyatheoides

Photo courtesy of
Milton Gottlieb

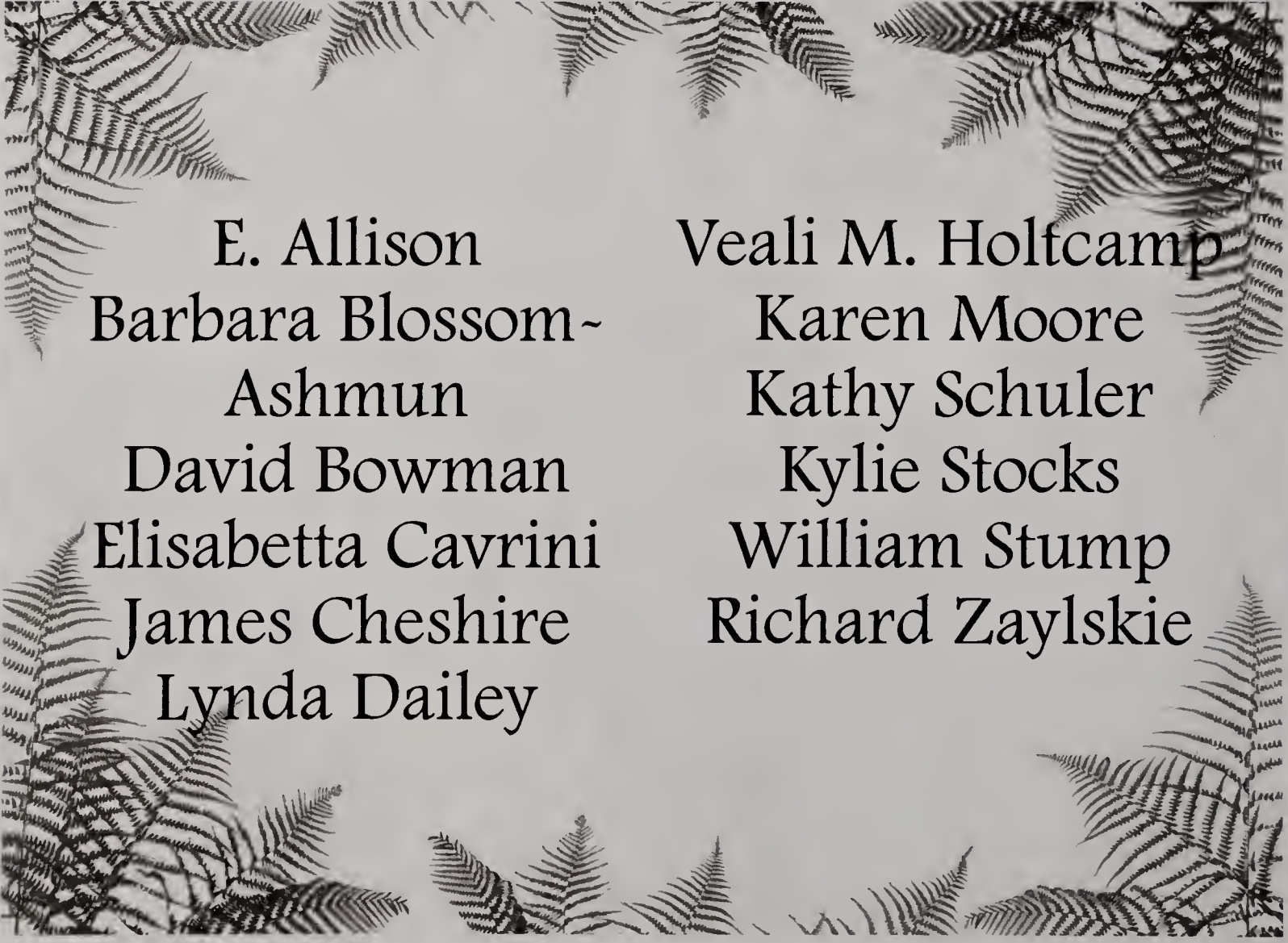


by a small flock of nesting, endemic nene (“nay-nay”) birds that are believed to have evolved over half a million years as a distinctive-looking, non-migratory species from an original pair or small group of Canada geese. They feed on grass and endemic *Scaevola* shrubs (Goodeniaceae). Increasingly rare, they thrive on Kaua‘i in the absence of the introduced, predatory mongoose. The rarest flowering plant in Hawai‘i, alula – *Brighamia insignis* (Campanulaceae) – a succulent that looks like loose-leaf cabbage on a stalk, is being propagated at the lighthouse. Yellow-flowered adult specimens are brush-pollinated by human volunteers, their pollinator moths now extinct. Excellent specimens of native, dioecious, screw pine *Pandanus tectorius* (Pandanaceae) dot the lighthouse grounds. They have skirts of sturdy prop roots and pineapple look-alike fruits.

Adorable chicks of the wedge-tailed shearwater wait patiently in hillside burrows along the lighthouse trail. Their parents return en masse at dusk to feed them the catch of the day. Rugged cliffs at the point provide prime nesting sites for red-footed boobies, and white and red-tailed tropicbirds. Their fishing activity attracts the harassing antics of great frigate birds – magnificent sights from trail lookouts.

~ *Part 2 will be featured in our next issue.*

Welcome New Members



E. Allison
Barbara Blossom-
Ashmun
David Bowman
Elisabetta Cavrini
James Cheshire
Lynda Dailey

Veali M. Holtcamp
Karen Moore
Kathy Schuler
Kylie Stocks
William Stump
Richard Zaylskie

~For immediate release ~

Contact:

Tavia Cathcart, Executive Director

Creasey Mahan Nature Preserve

12501 Harmony Landing Road, Goshen, KY 40026

Cell 502-407-7447, Office 502-228-4362

Tavia@KYNaturePreserve.org

**Introducing a New Demonstration Woodland Fern Garden
at Creasey Mahan Nature Preserve**

*The Fantastic Fern Fanatics - Ralph Archer & Doug Megginson –
are bringing their expertise to Goshen!*

Goshen, KY (Oldham County)-Creasey Mahan Nature Preserve is honored to have been selected by Ralph Archer and Doug Megginson as the site for a new fern and woodland demonstration garden site. Anyone who has visited Whitehall Gardens has seen this duo's masterpiece of a fern garden that was developed over a 10-year process (with help from the Jefferson County Master Gardeners and many plant donors).

Executive Director, Tavia Cathcart, exclaimed, *"I am thrilled to announce the new partnership between Creasey Mahan Nature Preserve and Ralph Archer to design and develop a new woodland fern garden featuring native ferns and wildflowers. This new garden will be available for all visitors to enjoy, and will be used as part of our extensive school field trips and educational programs."*



Maidenhair Fern

Photo courtesy of CMNP website

The new fern and woodland garden area will be located near the nature preserve's camping and fire pit area in a forested setting. This is adjacent to the very popular Frog Pond. This multi-year project will highlight a variety of native ferns including the southern lady fern, maidenhair fern, Christmas fern, royal fern, wood ferns, sensitive fern, as well as a variety of spleenworts. A wide selection of exotic (or non-native) and hardy ferns to Kentucky will be featured in this new area attraction.

Ralph Archer added, *"I am very pleased to be able to start this new venture. I hope, with Ms. Cathcart's knowledge of wildflowers, that we will be able to display native ferns in a unique natural setting as well as a garden display. This is a wonderful opportunity to build something that I hope will bring enjoyment to many in the Louisville region for years to come."*

As co-author of *"Wildflowers of Tennessee, the Ohio Valley, and Southern Appalachians,"* Tavia Cathcart will work with Ralph and Doug to ensure the gardens will offer seasonal flowering interest. The wildflowers and ferns will be labeled to assist the

visitor in identifying plants.

Creasey Mahan Nature Preserve's 168-acre site is a scenic and beautiful family destination. The new woodland fern garden, along with existing demonstration gardens, is sure to entice new visitors and encourage volunteer gardeners who may want to learn from the fern experts! Those interested in volunteering are encouraged to call (502) 228-4362 or e-mail Info@KYNaturePreserve.org.

About Ralph Archer

Mr. Archer calls himself "fernatic" and this term is well deserved. His love of ferns spans over 20-years and started on his 2-acre homestead. Ralph challenged himself to learn everything he could about ferns, has read extensively, attended fern gatherings, and eventually learned how to raise his own ferns from spores and by dividing ferns. He holds membership in the Hardy Fern Foundation, the American Fern Society, and the International Association of Pteridologists. He and his wife, Jean, sold ferns and perennials at farmer's markets, plant shows and to local gardeners. A graduate of the Kentucky Master Gardener's program and advanced Master Gardener's program, he also is listed as a speaker by the American Fern Society and lectures at garden study events and teaches others how to grow ferns. He has written and published numerous articles, including in the Hardy Fern Foundation Quarterly and the British Pteridological Society publication PTERIDOLOGIST.

About Doug Megginson

Mr. Megginson also has been interested in plants for many years. As a young man, he majored in botany during his college years at Ohio University. He is particularly interested in hostas and has won numerous blue ribbons in both regional and national hosta shows. As a "hostaholic," his personal collection of hostas includes over six hundred different varieties.

He is a member and former President of Hostas of Kentuckiana and a member of the Hardy Fern Foundation, American Hosta Society, and an honorary member of the Kentucky Master Gardeners. He has lectured at Hosta College, a part of the spring meeting of the Great Lakes region's American Hosta Society.

About Creasey Mahan Nature Preserve

The 168-acre nature preserve was setup as a non-profit organization in 1975 and made possible by the generous foresight and donations of Virginia Creasey Mahan and Howard Mahan. In 2009, the nature preserve welcomed over 26,000 visitors! Visitors can enjoy over 8.5-miles of winding trails, spring-fed creeks, waterfalls, grassland habitats and forest. For photos, visit www.KYNaturePreserve.org.

Tavia Cathcart, adds, "The nature preserve offers a refuge for a wide variety of animals, birds, and native plants. Not surprisingly, it also serves as a refuge for humans! It presents many opportunities for individuals and families to explore and enjoy a natural environment."

Creasey Mahan Nature Preserve is open every day from dawn to dusk, and it is always free to enjoy the grounds. Office hours are 8:30 a.m.-4:30 p.m., Monday through Friday. March through October, Creasey Mahan Nature Preserve offers "Open House Saturday" on the third Saturday of every month. Interpreter-led forest hikes are

offered, as well as tours of the 200-year old Mahan Manor and Spring House. The Mahan Library branch resides in the nature preserve's old dairy barn and the City of Goshen's playground is on the preserve grounds.

Creasey Mahan Nature Preserve
Tavia Cathcart, Executive Director
12501 Harmony Landing Road, Goshen, KY 40026
(502) 228-4362 - www.creaseymahannaturepreserve.org

Photos are available. Contacts for quotes:

Creasey Mahan Nature Preserve – Tavia Cathcart 502-407-7447 or
Tavia@KYNaturePreserve.org

Fern Ecology

Tom Stuart
Croton Fall, New York

Klaus Mehltreter, Lawrence R. Walker and Joanne M. Sharpe, editors, Cambridge University Press, 2010
ISBN 978-0-521-72820-1 paperback, 444 pp+xvi, color plates, charts, tables, figures, glossary, index

Ecology, yes, but as they say, much, much more. Books like this come along rarely. *Fern Ecology* surveys current scholarship in pteridology excepting classical morphology and the hot spot, molecular biology.

The major topics and authors:

Biogeography: dispersal, vicariance, range, endemism - *Michael Kessler*

Life histories of gametophytes and sporophytes, phenology - *Joanne M. Sharpe and Klaus Mehltreter*

Nutrients: acquisition, soil fertility, impact on ecology - *Sarah J. Richardson and Lawrence R. Walker*

Fern adaptation to drought and desert - *Peter Hietz*

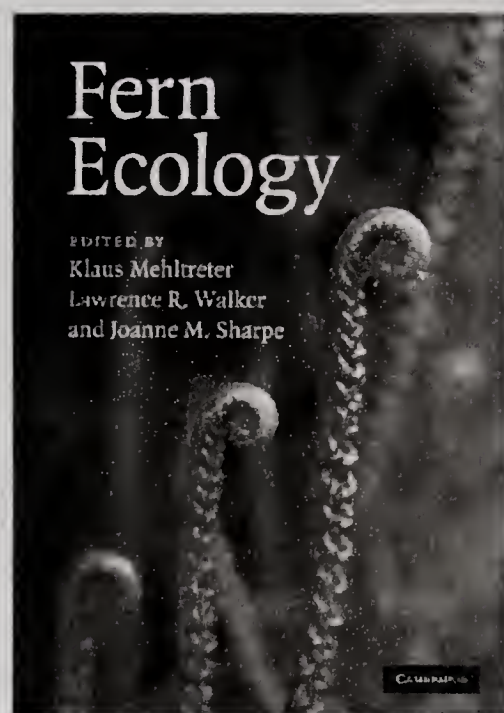
Disturbance and Succession - *Lawrence R. Walker and Joanne M. Sharpe*

Interactions with fungi and animals - *Klaus Mehltreter*

Weeds: native and alien problem ferns, management techniques -

Roderick C. Robinson, Elizabeth Sheffield and Joanne M. Sharpe

Conservation - *Klaus Mehltreter*



If you have been around pteridophyte research, the authors are familiar. These substantive accounts, surveys of the current state of research, backed up with pertinent

references, are bracketed with an intro and a wrap-up of current problems, both by the editors.

It is hard to choose favorite passages, but one candidate for me is the extended discussion of life cycle by Sharpe and Mehltreter. The standard clockwise diagram in so many biology texts has simplified reality to the point of falsity, while the example given here for *Danaea wendlandii* is so, so refreshing. Study it for a few minutes. Don't you wish there were a chart for every fern?



Life cycle of *Danaea wendlandii*:

- A, spore dispersed to disturbed substrate
- B, gametophyte
- C, sporeling
- D, young sporophyte
- E, croziers
- F, mature sporophyte with immature fertile leaf
- G, mature fertile leaf
- H, young sporophyte (ramet from fertile leaf-tip bud)
- I, young sporophyte (ramet that develops from stipule bud on abscised petiole remnant when petiole is damaged)
- J, patch of multi-age sporophytes

Dashed lines are vegetative propagation. Scale bar represents 1 cm in B, C, D, H, I; 5 cm in E, F, G; 10 cm in J. Drawn by Elizabeth Farnsworth.

Desert ferns are a main item in Peter Hietz's discussion of drought tolerance, but much to my surprise, so were filmy ferns. These ferns have blades one cell thick and thus lack a cuticle, a structure that moderates CO₂ and H₂O uptake and release. They dry out quickly; and re-hydrate just as fast, a condition called *poikilohydry* (easily found in the 22 page glossary). Some filmies are also dessication tolerant, meaning they can survive a dry period through dormancy.

Among the hardy ferns, the sporophytes of *Cheilanthes* and other desert ferns make up the bulk of drought-tolerant species, but many more ferns exhibit this in the gametophyte phase.

Another way to deal with drought is to just shed leaves. One might think of the annually deciduous hardy ferns as just an adaptation to winter's lack of water. In the tropics, in the seasonally-dry forest, many ferns adopt the same strategy.

Bracken appears more often in this book than any other fern, in part due to its economic impact. *Pteridium aquilinum* is also notable for an addiction to nutrient-poor soils, reported by Richardson and Walker. It is a hands down winner in predicting a nitrogen deficiency. If you're looking for a site for the vegetable garden, don't choose a bracken patch. Who would have guessed?

Eighty percent of ferns have mycorrhizal associations: one of the more surprising facts to learn in Klaus Mehltreter's chronicle of interactions between ferns and fungi. This chapter is fun, particularly when he dives into interactions with animals, and ants in particular.

Fun is not the word to describe the same author's guide to conservation. Only 2% of ferns have had an extinction risk assessment with 89% of these receiving an *at risk* grade. No doubt there was some bias built into selecting the 2%, but this ought to be a wake up call. Mehltreter goes on to expand on factors lacking in assessments, factors that will improve reliability.

Some discussions – for example Michael Kessler's evaluation of biodiversity, abundance, long-distance spore dispersal, and vicariance – do not lend themselves to short paragraph snippets. You will just have to pick up the book.

The only comparable book surveying much of the same territory is Robbin Moran's 2004 *A Natural History of Ferns*, a very tasty appetizer. *Fern Ecology* is the whole enchilada.



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are still available!**

**Order on our website under
the “shop” page or e-mail us
at hff@rhodygarden.org.**

That Was the Winter That Was (TW3) and More

Jerry Hudgens
Churchville, MD

The winter of 2009-2010 was a record-setter for the Mid-Atlantic region of the United States, but 2010 has been unusual for more than the record snow accumulations that distinguished the winter. The question to be addressed here is "How have our garden plants been affected?"

First, the Weather stats: The closest I can come to providing solid observations in this report is to cite the "official" snowfall statistics for the greater Baltimore area; my own records, while recorded regularly, were certainly less reliable than those obtained by the professionals. The rain measurements are my own as measured here ~30 miles (48 km) north of Baltimore, Maryland. I will be referring to records for the time frame December 2009 to September 2010 and will make some slight adjustments for the actual periods mentioned.

Since the major newsworthy weather category was the record snowfall during the winter, I will begin there. The snowfall can be conveniently divided into two periods. From 4 Dec. 09 to 8 Jan. '10, ~24" (61.0 cm) of snow fell, and between 30 Jan. and 28 Feb. '10, an additional ~53" (136.6 cm) were recorded for a total of 77" (195.6 cm). This compares with official averages over a 30-year period of 0.6" (1.5 cm) in Nov., 1.7" (4.3 cm) in Dec., 7" (17.8 cm) in Jan., 6.4" (16.3 cm) in Feb., and 2.4" (6.1 cm) in Mar. and an average annual total of 18" (45.7 cm) over the 10 years prior to this past winter. Typically, since our snow amounts are not great, they melt quickly as the temperatures rise; this was not the case this past winter. While the winter was not at all cold for this region, the snow accumulations were such that we had an almost continuous snow cover in Feb. that became more dense and crushing with each relatively warm period. (photo pg. 15)

During the past year, the non-frozen precipitation was rather erratic. Prior to the heavy Feb. snowfalls, we received 6.75" (17.1 cm) of rain, and following the heavy snows we received another 5.75" (14.6 cm) of rain through the end of Mar. Over the next three months we received only 5.5" (14.0 cm) of rain. That was followed by over 10" (25.4 cm) from mid July through mid Aug. and then a mere 1" (2.5 cm) from then through mid Sep., so far.

While this area is not unaccustomed to regular periods of drought, this year was a record-breaker for heat in addition. To date, the area has had a record 56 days over 90 degrees Fahrenheit (F) [32 degrees Celsius (C)], and more days that warm are predicted for the coming week; several days over 100 degrees F (38 C) were among those over 90 degrees. Moreover, of course, almost all of those hot days arrived during the time of little to no rain. Probably, the set of conditions that have stressed our plants the most is that the temperatures have tended to alternate between 20 degrees F (7 C) or so above normal and 20 degrees or so below normal. As most true gardeners know well, plants

can better tolerate cold dry weather than hot dry weather. Seldom were we blessed with cool temperatures when dry.

I'm sure that many readers in other parts of the world will not be impressed by what I describe as unusual and difficult weather conditions. However, it will be kind for those readers to realize and concede that these conditions, because they are so unusual for this area, put a great deal of stress on both the plants and the sole gardener (of 4.5 acres) (1.8 hec) here at Fern Dell. It is the custom for this gardener to hand-carry water to the hundreds of plants added annually for at least two years during periods of little rain. Some aspect of this custom is soon going to have to change: either fewer new plants or less watering (with the consequent losses). I guess I should mention that here, in our almost totally wooded gardens, the competition for soil moisture is fierce. Our home is supplied with water from an underground well, which provides the minimum-acceptable flow rate by county regulations (which means using well water for plants puts our home use in jeopardy). It is our good fortune to have a stream at the back bottom part of our property that has had a continuous flow except for one very long drought a few years ago. I am able to dip and carry two sprinkling buckets of water at a time to plants throughout the gardens (lucky me).

[Shortly after submitting my draft of this report to Sue Olsen in late September of 2010, on 30 September, the remnants of Tropical Storm Nicole brought us a record 9.65 inches (24.5 cm) of rain in a single day, a record for this area. Apparently, even past hurricanes have not dropped that much rain here in such a short period. While the area suffered much temporary flooding, the only notable garden effect here was some washed out pathways on the hillside. It certainly has been a bizarre weather year here so far; I can hardly wait to see what the rest of the year brings us.]

So now, you might wonder, how were the plants at Fern Dell affected by these unusual conditions? I should interject here that what is to follow is not based on any sort of systematic observation. This is difficult for me as a trained scientist to admit and to put forth for criticism; it is, however, what it is. Coming out of winter, one would have thought the gardens would never recover. There were broken tree tops and major limbs down; there were crushed shrubs lying on the ground; and evergreen perennials were flattened. By the time of our first garden tour of the season, which thankfully was not until mid-spring this year, however, the gardens were in great condition. All that was required was several year's worth of pruning and backbreaking hauling of debris from the beds and mowed areas; that's all. The most damage was to Rhododendrons and to the brittle Tulip Trees (*Liriodendron*); the former should recover, while the latter will probably continue to decline over many years or decades.

But what were the effects on the tens of thousands of ferns at Fern Dell? For the most part, I believe there were no unusual losses. There were, however, what I have come to accept as the usual losses---of cheilanthes and other xeric types and of a few of the so-called marginally hardy sorts. It should be noted though that, probably because of the prolonged snow cover and relatively less cold temperatures, there were fewer than the usual losses in the latter category. The major negative effect that I have "observed" is distorted fronds on many ferns with the initial flush of growth. In most cases, the subsequent frond growth has been normal. I would appreciate knowing if others have ever

experienced this and if there is a good explanation. I can only guess it relates to the prolonged heavy snow cover.

There were, however, two notable observations regarding the “ferns” at Fern Dell, one representing bad news and the other good news. The bad is that *Selaginella uncinata*, planted in 1997 and having survived much colder winters, and which had grown into a colony so large I was having to edit it severely each year, was almost entirely wiped out; a mere three tiny and struggling remnants remain. None of the many other selaginellas showed any problems. The very good news is that, in my rock garden where I have planted and lost many cheilanthes, on a vertical edge of a large moss-covered rock and growing in the moss, I now have a volunteer *Cheilanthes*. I do believe I have finally discovered what others refer to as “excellent drainage”!

Conclusions: TW3, of course, is a reference to the 1960s satirical TV news show with David Frost, for those who are old enough to remember. The really good news is that my Rhododendrons, hundreds of east-coast native azaleas, dogwoods and other flowering trees and shrubs have never had so many buds. Next spring should be magnificent! And the ferns---they are the really tough characters here at Fern Dell. Fear not for them. And please plan to visit them when in the area.

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BPS/HFF Southeast USA Fern Tour June 13-27, 2011

There are still a few spots available. If you are interested please respond quickly. Complete tour details are listed in our Fall 2010 Quarterly.

To join us, contact Naud Burnett:

Email: trip@casaflora.com
naud@casaflora.com (office)
naudbur@hotmail.com (home)

Phone: 972-225-6111 (office)
214-526-4966 (home)
214-908-5494 (cell)



HARDY FERN FOUNDATION

2011 SPORE EXCHANGE

To Order: Please print your selections in alphabetical order. Include 50 cents for each fern requested, postage (Check made payable to Hardy Fern Foundation) and a self addressed bubble envelope (please do not attach the postage to the envelope). If you are ordering more than a half dozen packages, please send additional postage up to one dollar's worth. There are no additional charges applied to overseas members, but please enclose an international postage coupon (2 for large orders) and an envelope. Please list a first and second choice. Some items are limited, so order early for best selection. If both choices are unavailable, would you like to donate the additional money to the foundation, or hold it for another order? If neither is indicated, we will consider it a donation to our endowment fund. At this time orders are not taken from the internet, so please follow instructions above. Orders will be sent within a month of post mark date.

Your fresh spores are always appreciated!!! We are trying to restock our inventory this year, so please consider collecting spore and donating it to the exchange. (Please package with collector's last name and year collected on package - individually packaged spore is much appreciated).

Mail requests to:
Carolyn Doherty
HFF Spore Exchange Director
1905 43rd ST SE
Puyallup, WA 98372
or send her an e-mail,
fernspores@hotmail.com.



Hardy Fern Foundation Spore Exchange List 2011

Genus * Species * Variety or Cultivar * Year * Donor(s)

Adiantum aleuticum 'Subpumilum' - '07, '10, RSF
Adiantum thalictroides - '09, EMBG
Arachnoides davalliaeformis - '10, Olsen
Athyrium filix-femina - '07, Peachy
Blechnum chilense 'Red Form' - '08, EMBG
Blechnum niponicum - '09, '10, RSF
Blechnum spicant 'Rickard's Serrate' - '10, RSF
Camptosorus sibiricus - '10, Gassner
Cheilanthes alabamensis - '10, Olsen
Cheilanthes lanosa - '10, Peachey
Cheilanthes quadripinnata - '10, Olsen
Cheilanthes wrightii - '09, RSF
Cyrtomium fortunei - '10, Peachey
Cyrtomium lonchitoides - '10, RSF

Cyrtomium macrophyllum var. *tukusicola* - '08, '10, RSF
Dryopteris decipiens - '09, RSF
Dryopteris erythrosora - '08, Weesjes
Dryopteris filix-mas - '07, Peachy
Dryopteris ludoviciana - '05, McGill
Dryopteris marginalis - '08, Briegel
Dryopteris namegatae - '05, RSF
Dryopteris sieboldii - '08, '10, Weesjes, RSF
Dryopteris sublacera - '05, '07, RSF, Gassner
Matteuccia intermedia - '08, Gottlieb
Polypodium glycyrrhiza - '10, Doherty
Polypodium interjectum - '09, '10, RSF
Polystichum acrostichoides - '03, Briegel
Polystichum aculeatum - '04, '05, RSF, Gassner
Polystichum braunii - '07, Peachy
Polystichum californicum - '05, RSF
Polystichum imbricans - '07, RSF
Polystichum lonchitis - WC Scotland - '10, Olsen
Polystichum makinoi - '10, Peachey
Polystichum monticola - '10, Olsen
Polystichum retrosopaleaceum - '10, RSF
Polystichum stenophyllum - '10, Olsen
Polystichum vestitum - '10, Olsen
Polystichum xiphophyllum - '10, RSF
Woodsia polystichoides - '10, RSF



Osmunda claytoniana
 Interrupted fern

Donors

Kevin Briegel, Ohio - Jerry Doherty, Washington - Elisabeth Miller Botanical Garden (EMBG), Washington - Wolfram Gassner, Germany - Joan Gottlieb, Pennsylvania - Peggy McGill, Alabama - Sue Olsen, Washington - Harold Peachy, New York - Rhododendron Species Foundation (RSF), Washington - Evelyn Weesjes, British Columbia

~WC denotes wild collected

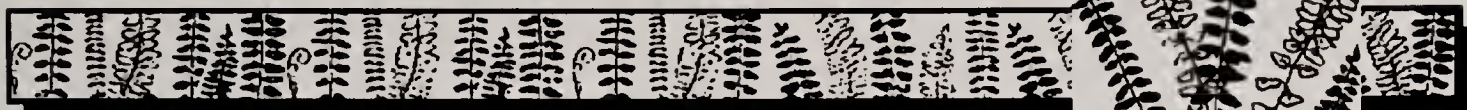
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*Please send your
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